

## Prevalence of tick borne encephalitis virus in tick nymphs in relation to climatic factors on the southern coast of Norway

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### Abstract:

**BACKGROUND:** Tick-borne encephalitis (TBE) is among the most important vector borne diseases of humans in Europe and is currently identified as a major health problem in many countries. TBE endemic zones have expanded over the past two decades, as well as the number of reported cases within endemic areas. Multiple factors are ascribed for the increased incidence of TBE, including climatic change. The number of TBE cases has also increased in Norway over the past decade, and the human cases cluster along the southern coast of Norway. In Norway the distribution and prevalence of TBE virus (TBEV) in tick populations is largely unknown. The objectives of this study were to estimate the TBEV prevalence in *Ixodes ricinus* from seven locations and to assess the relationship between the TBEV prevalence and site-specific climatic variables. **METHODS:** A total of 5630 questing nymphs were collected and analyzed in pools of ten. All pools were screened with an in-house real-time RT-PCR, and the positive pools were pyrosequenced. Two methods, minimum infection rate (MIR) and a frequentist method (EPP) for pooled prevalence estimations were calculated and compared. Climatic data were descriptively compared to the corresponding EPP of each location in order to explain variations in TBEV prevalence. **RESULTS:** The seven foci of TBEV had an estimated overall prevalence (EPP) in pools of nymphs combined, of 0.53% with 95% CI (0.35-0.75), with point prevalence ranging between 0.11%-1.22%. The sites with the highest point prevalences were within the municipalities which had the highest numbers of registered TBE cases. The results indicate that the location with highest point prevalence had the highest relative mean humidity and lowest mean saturation deficit and vice versa for the lowest EPP. **CONCLUSION:** Our study confirms the existence of TBEV endemic foci in Norway. These results are of importance to increase the awareness of TBEV infections in Norway and could be used for public information and recommendations of TBE vaccination. EPP is the method of choice for pooled prevalence calculations, since it provides estimated prevalences with confidence intervals. Our findings emphasise the possible importance of microclimatic conditions regarding the TBEV prevalence in ticks.

**Source:** <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3497858>

### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Meteorological Factors, Other Exposure

# Climate Change and Human Health Literature Portal

**Other Exposure:** saturation deficit

**Geographic Feature:** ☒

resource focuses on specific type of geography

Ocean/Coastal

**Geographic Location:** ☒

resource focuses on specific location

Non-United States

**Non-United States:** Europe

**European Region/Country:** European Country

**Other European Country :** Norway

**Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Infectious Disease

**Infectious Disease:** Vectorborne Disease

**Vectorborne Disease:** Tick-borne Disease

**Tick-borne Disease:** Tick-borne Encephalitis

**Resource Type:** ☒

format or standard characteristic of resource

Research Article

**Timescale:** ☒

time period studied

Time Scale Unspecified